

CLAIMS

1. A telecommunications system having a plurality of data modems linked to a central station by subscriber lines of differing lengths, in which duplex data is transmitted between said central station and one, or more, modems using VDSL, said subscriber lines being grouped into longer and shorter lines, characterised in that FDD is employed at lower frequencies for transmissions over said longer lines and OFDD is employed at higher frequencies for transmissions over said shorter lines.
2. A telecommunications system, as claimed in claim ~~2~~, characterised in that an extra cyclic prefix is used for OFDD transmissions over shorter lines, and in that frequencies above an FDD band are not used for longer lines.
3. A telecommunications system, as claimed in ~~either claim 1, or claim 2~~, characterised in that shorter lines are classified as lines having a length less than X metres and longer lines are classified as lines having a length equal to, or greater than X metres, where X is a design parameter selected for a given telecommunications system.
4. A telecommunications system, as claimed in ~~either claim 2, or claim 3~~, characterised in that said cyclic prefix is dimensioned for a shorter line.
5. A telecommunications system, as claimed in claim 3, ~~or claim 4~~, when dependent on claim 2, characterised in that said cyclic prefix is dimensioned for a line of length X metres.
6. A telecommunications system, as claimed in ~~any of claims 2 to 5~~, characterised in that time-synchronisation is performed between all transmitters in ONUs and NTs incorporated in said system.
7. A telecommunications system, as claimed in ~~any of claims 2 to 6~~, characterised in that timing advance is calculated for each line from the line's

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length.

8. A telecommunications system, as claimed in ~~any previous claim~~, characterised in that different sub-carriers are used in up-stream and down-stream transmission directions.

9. A telecommunications system, as claimed in ~~any previous claim~~, characterised in that a power boost is applied to FDD band transmission.

10. A telecommunications system, as claimed in ~~any previous claim~~, characterised in that both ADSL and VDSL are employed.

11. A telecommunications system, as ^{claimed} ~~claimed~~ in ~~any previous claim~~, characterised in that both ADSL and VDSL are employed on a single wire.

12. A telecommunications system, as claimed in ~~either claim 10 or claim 11~~, characterised in that the frequency band employed for FDD is the same as that employed for ADSL in both the up-stream and down-stream transmission directions.

13. A telecommunications system, as claimed in ~~any of claims 10 to 12~~, characterised in that said FDD band frequencies are power boosted to the same power level as that employed for ADSL.

14. In a telecommunications system having a plurality of data modems linked to a central station by subscriber lines of differing lengths, said subscriber lines being grouped into longer and shorter lines, a method of transmitting duplex data between said central station and one, or more, modems using VDSL, characterised by using FDD for transmission at lower frequencies over said longer lines and OFDD for transmission at higher frequencies over said shorter lines.

15. A method, as claimed in claim 14, characterised by using an extra cyclic prefix for OFDD transmissions over shorter lines, and by not using frequencies above an FDD band for transmission over longer lines.

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- A 16. A method, as claimed in ~~either claim 14, or claim 15~~, characterised by classifying shorter lines as those lines having a length less than X metres and longer lines as those lines having a length equal to, or greater than, X metres, where X is a design parameter selected for a given telecommunications system.
- PS 17. A method, as claimed in ~~either claim 15, or claim 16~~, characterised by dimensioning said cyclic prefix for a shorter line.
- A 18. A method, as claimed in ~~claim 16, or claim 17~~ when dependent on claim 15, characterised by dimensioning said cyclic prefix for a line of length X metres.
- A 10 19. A method, as claimed in ~~any of claims 15 to 18~~, characterised by performing time-synchronisation between all transmitters in ONUs and NTs incorporated in said system.
- A 20. A method, as claimed in ~~any of claims 15 to 19~~, characterised by calculating timing advance for each line from the line's length.
- A 15 21. A method, as claimed in ~~any of claims 14 to 20~~, characterised by using different sub-carriers in up-stream and down-stream transmission directions.
- A 22. A method, as claimed in ~~any of claims 14 to 21~~, characterised by applying a power boost to FDD band transmissions.
- A 23. A method, as claimed in ~~any of claims 14 to 22~~, characterised by employing both ADSL and VDSL.
- A-20 24. A method, as claimed in ~~any of claims 14 to 22~~, characterised by employing both ADSL and VDSL on the same wire.
- A 25. A method, as claimed in ~~either claim 23, or claim 24~~, characterised by employing the same frequency band for FDD as that employed for ADSL in both the up-stream and down-stream transmission directions.

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26. A method, as claimed in ~~any of claims 23 to 25~~, Characterised by power boosting said FDD band frequencies to the same power level as that employed for ASDL.

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